Worldwide Ocean Temperature EDA

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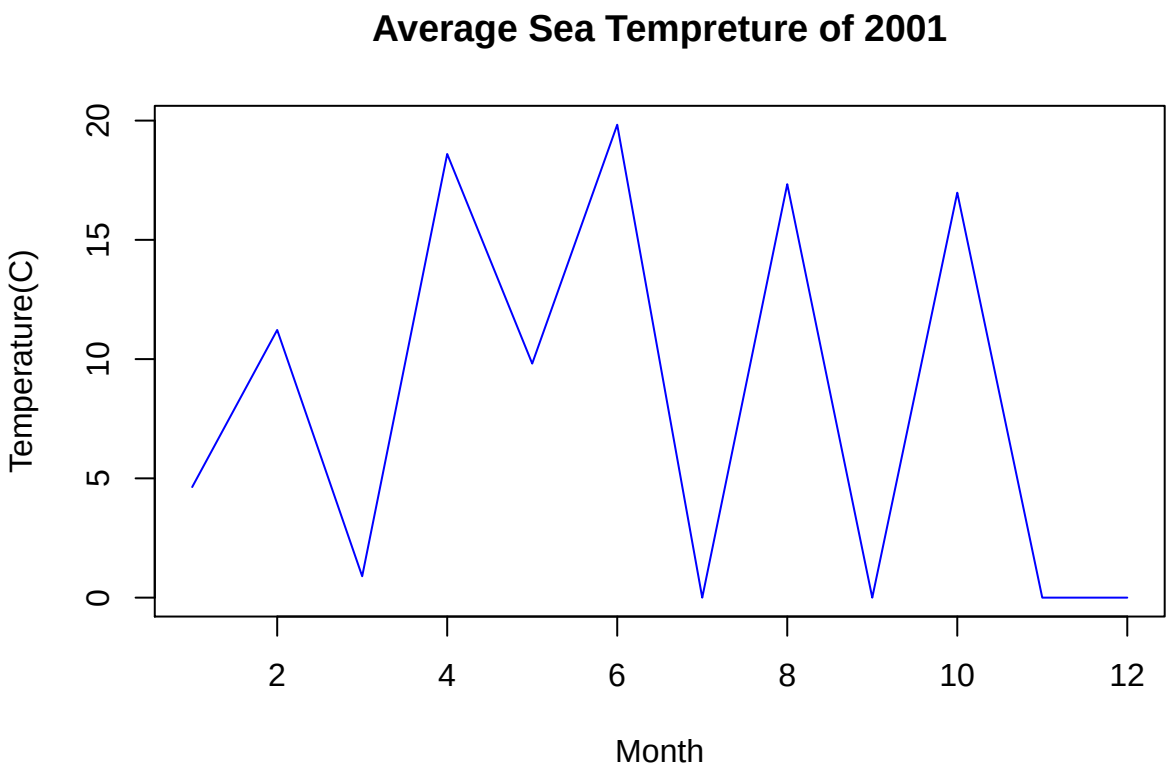
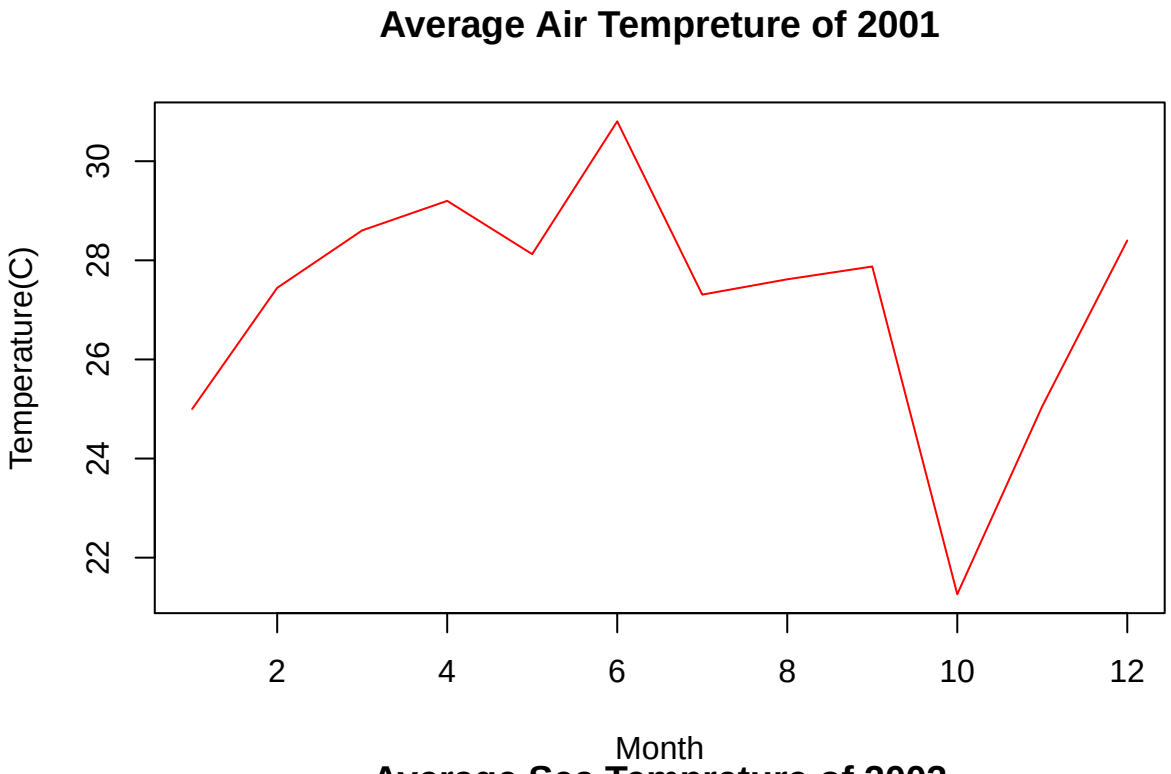
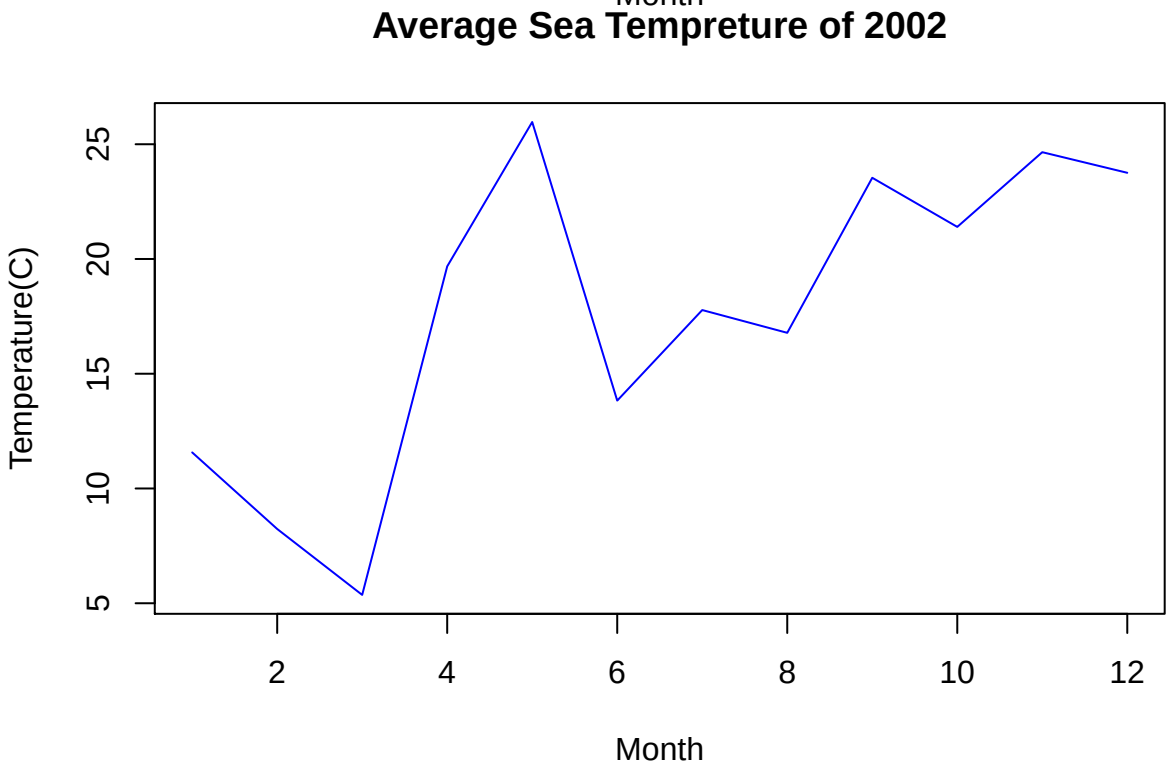
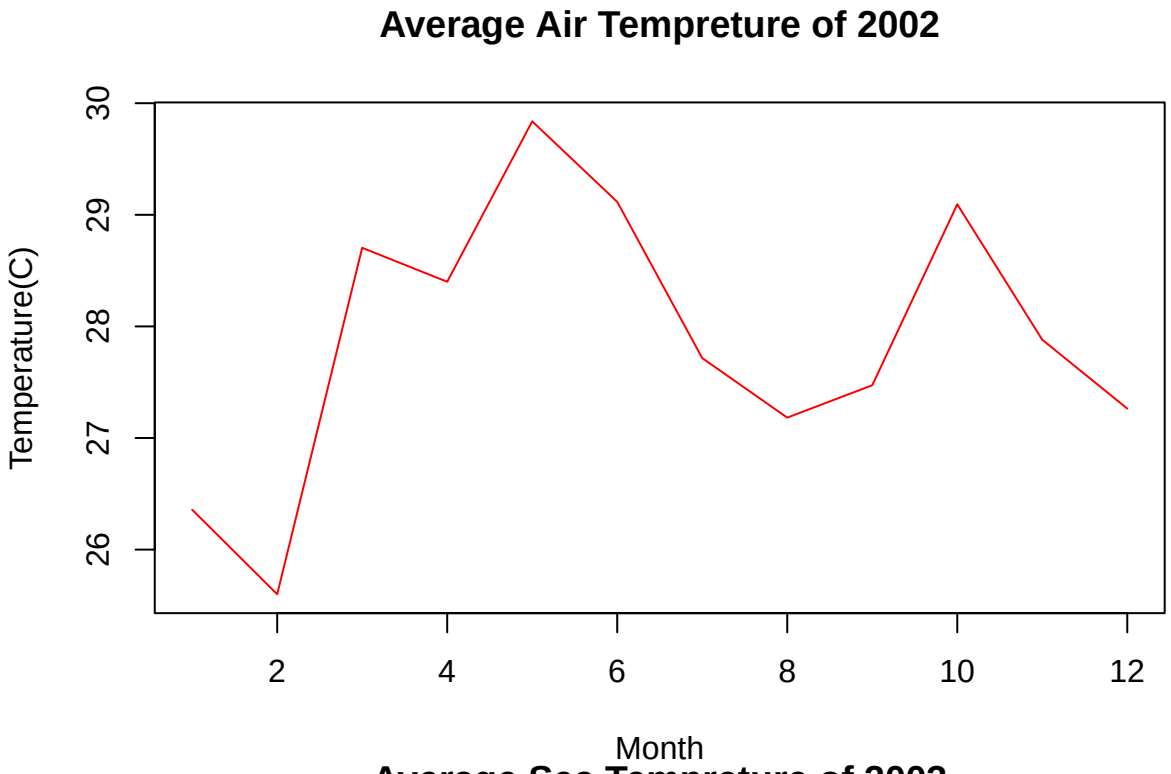
2017/11/6

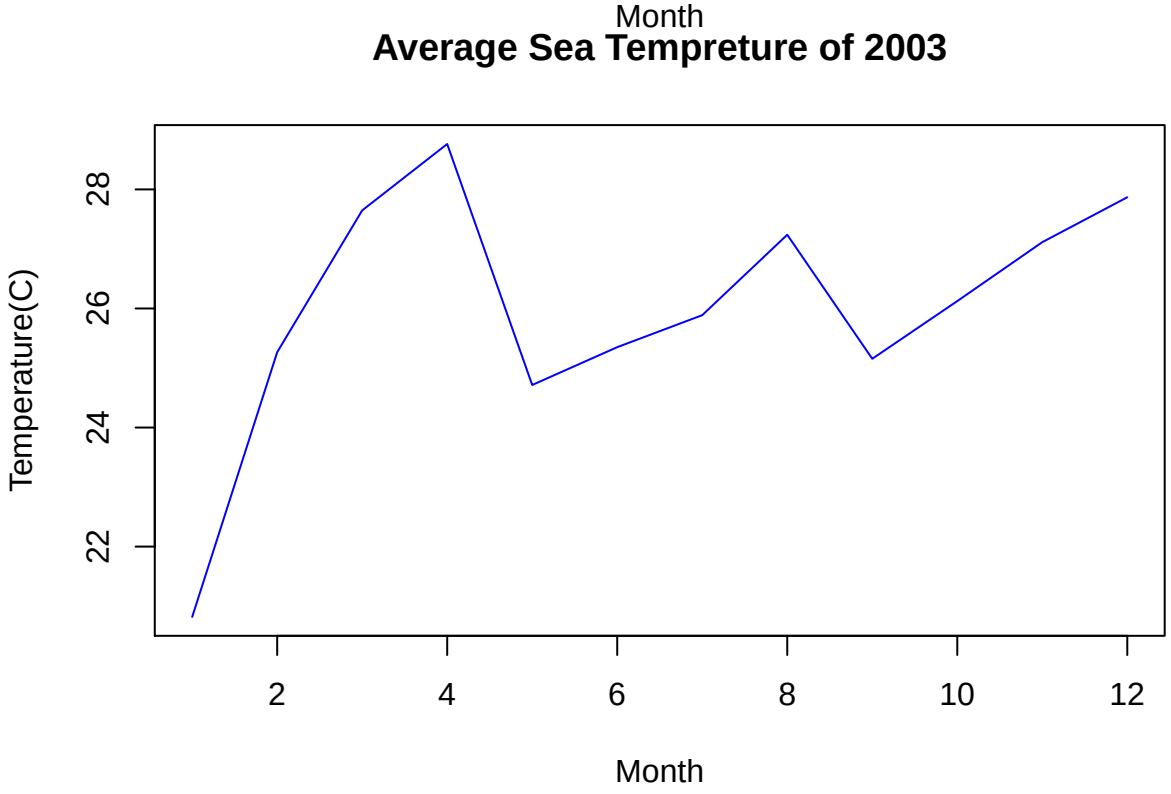
```
matrix.jan.temp = NULL
matrix.aug.temp  = NULL

#### the following loop will generate the graphs
##### and it will build two matrices to track the average temprtures of two months through out the 16 y
for (k in 2001:2016) {
  YEAR = k

  load(paste0("./cleaned_data/ave_temp_",YEAR,".Rdata"))
  plot(EDA.year[,2], type = "l",  main = paste("Average Sea Tempreture of", YEAR, sep = " ") , xlab = "
  plot(EDA.year[,3], type = "l",  main = paste("Average Air Tempreture of", YEAR, sep = " ") , xlab = "

  jan.temp = EDA.year[1,2:3]
  aug.temp = EDA.year[8,2:3]
  #jan.temp = cbind(YEAR, jan.temp)
  matrix.aug.temp = rbind(matrix.aug.temp , aug.temp)
  matrix.jan.temp = rbind(matrix.jan.temp , jan.temp)
}
```

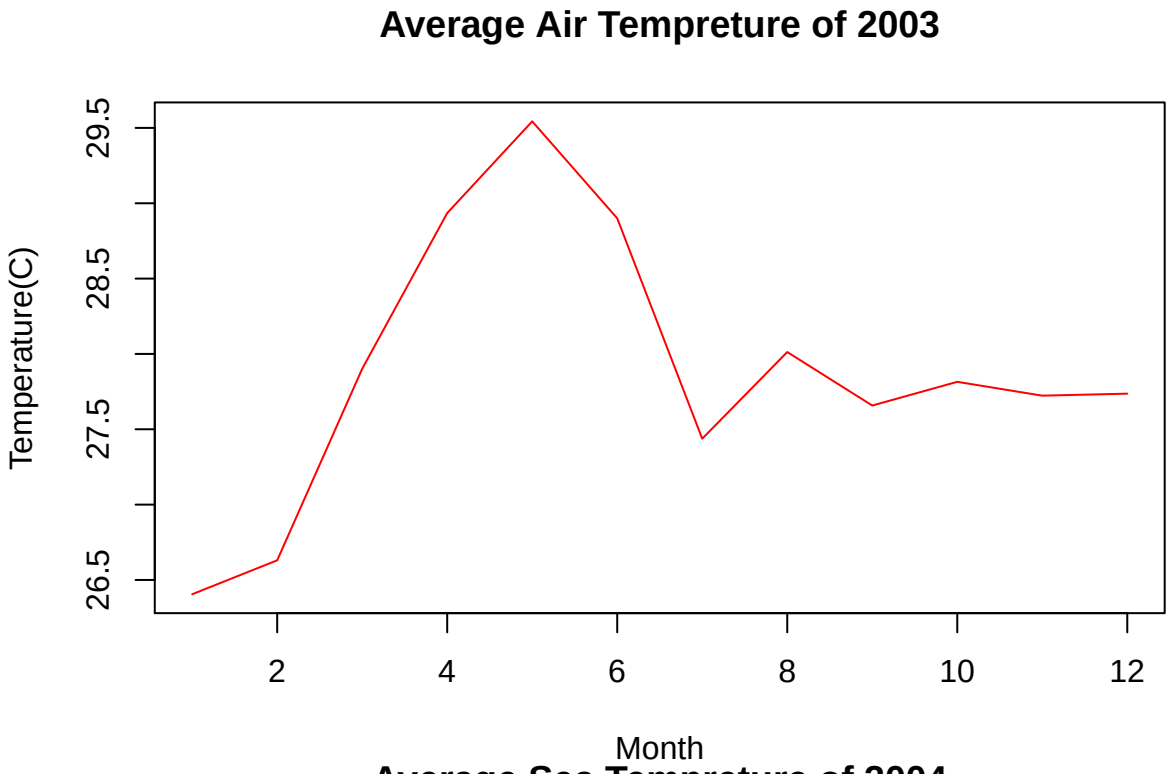


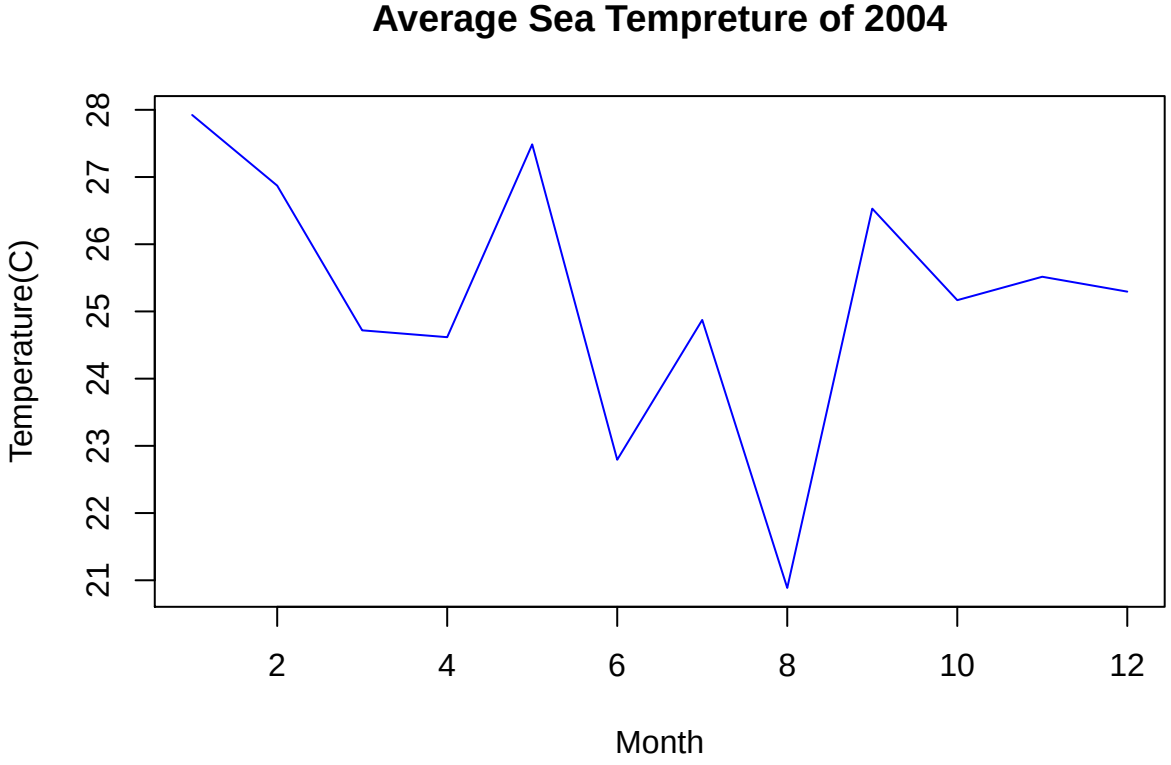

Average Air Tempreture of 2001
Temperature(C)
22
24
26
28
30
2
4
6
8
10
12
Month

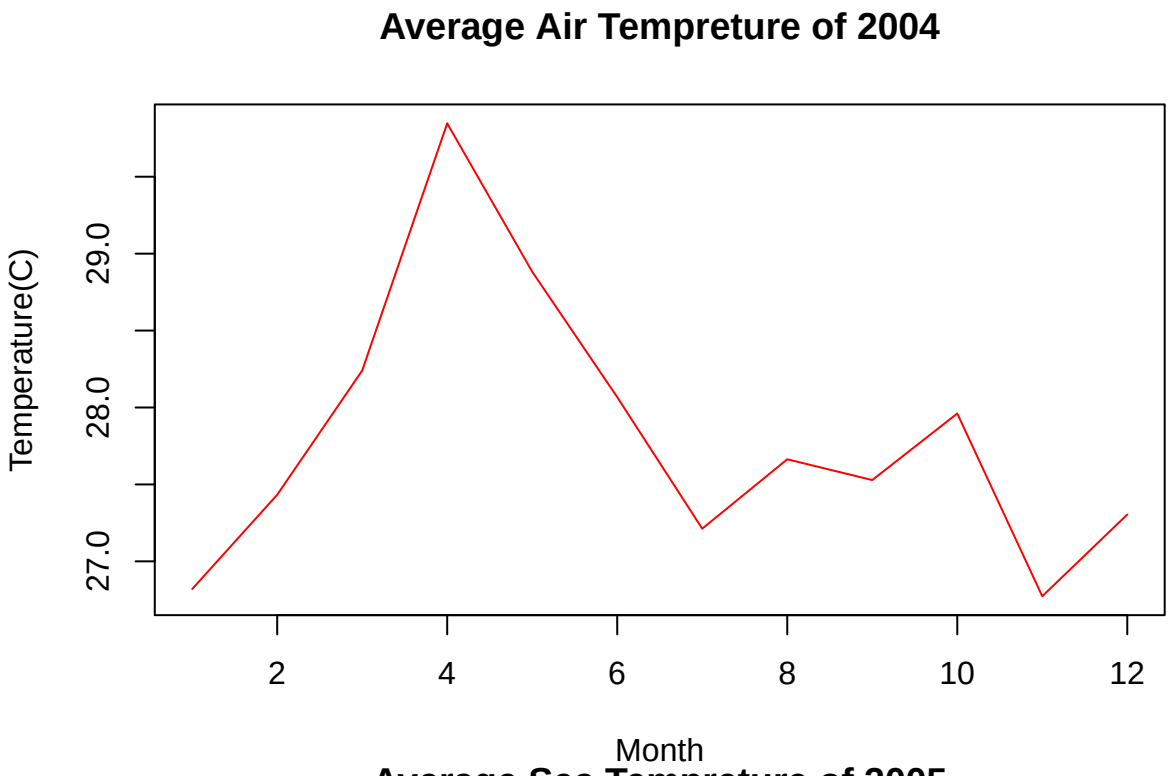

Average Sea Tempreture of 2002
Temperature(C)
5
10
15
20
25
2
4
6
8
10
12
Month

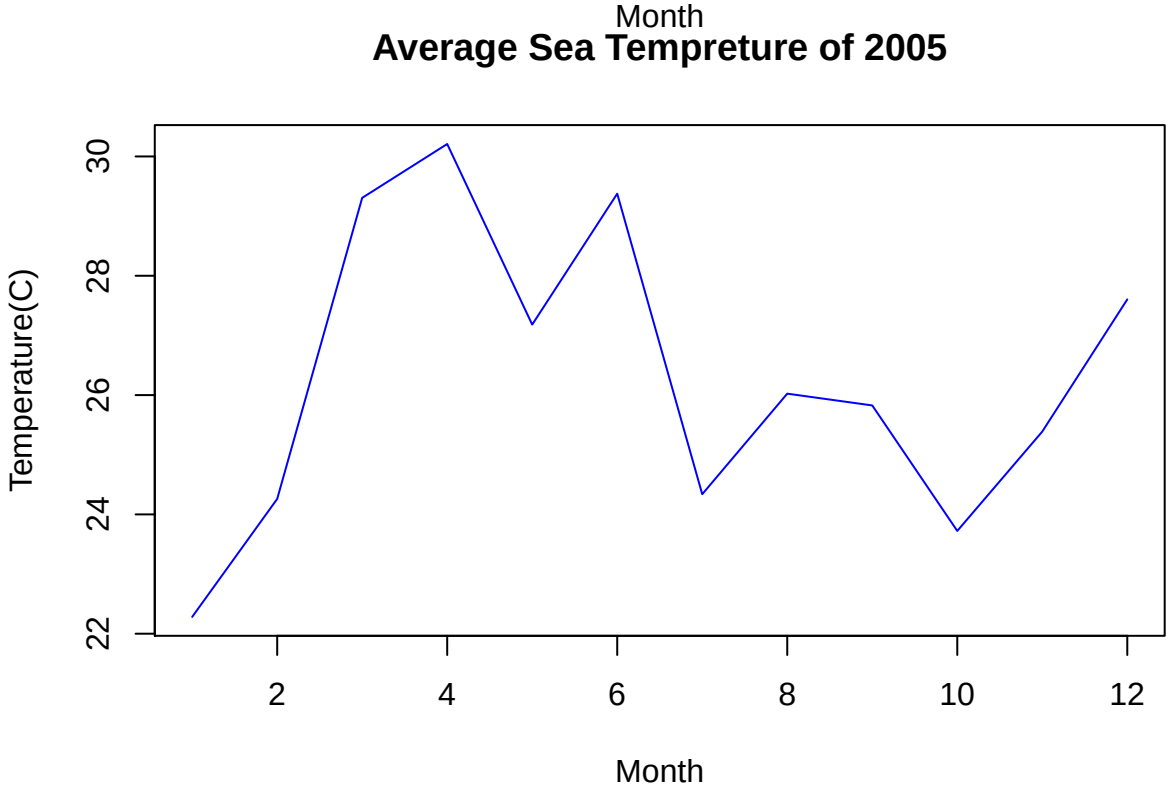

Average Air Tempreture of 2002
Temperature(C)
26
27
28
29
30
2
4
6
8
10
12
Month

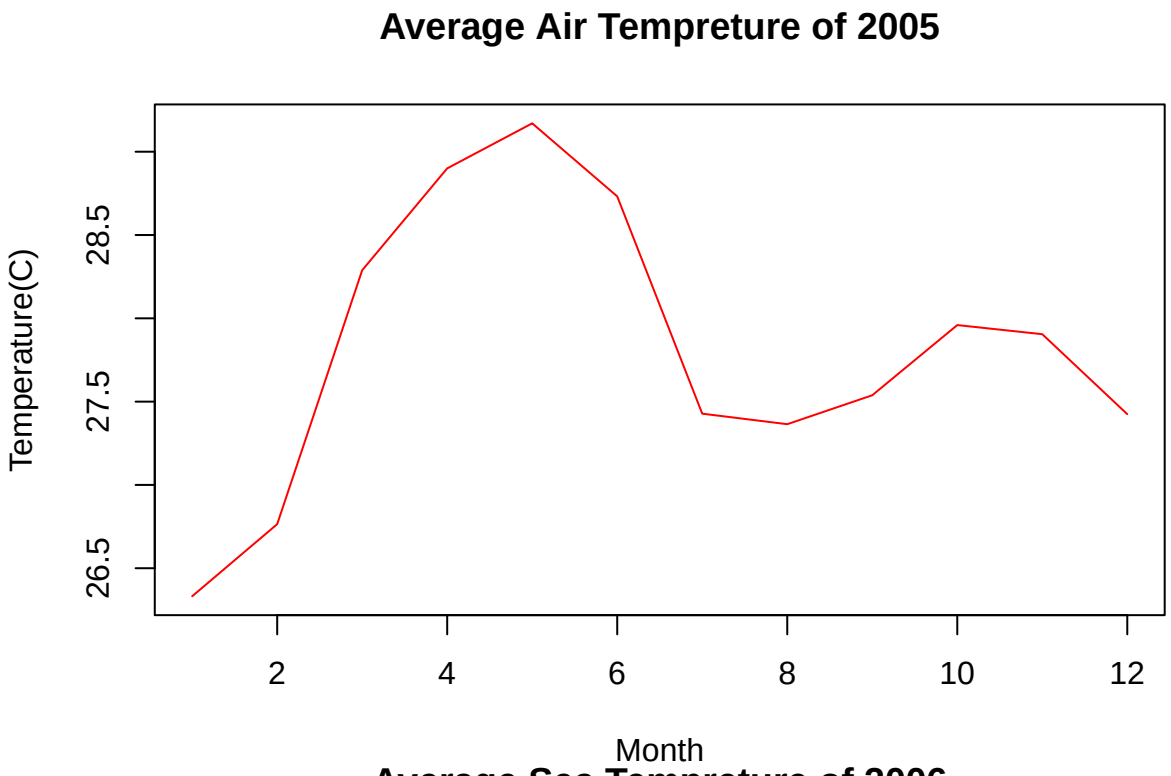

Average Sea Tempreture of 2003
Temperature(C)
22
24
26
28
2
4
6
8
10
12
Month

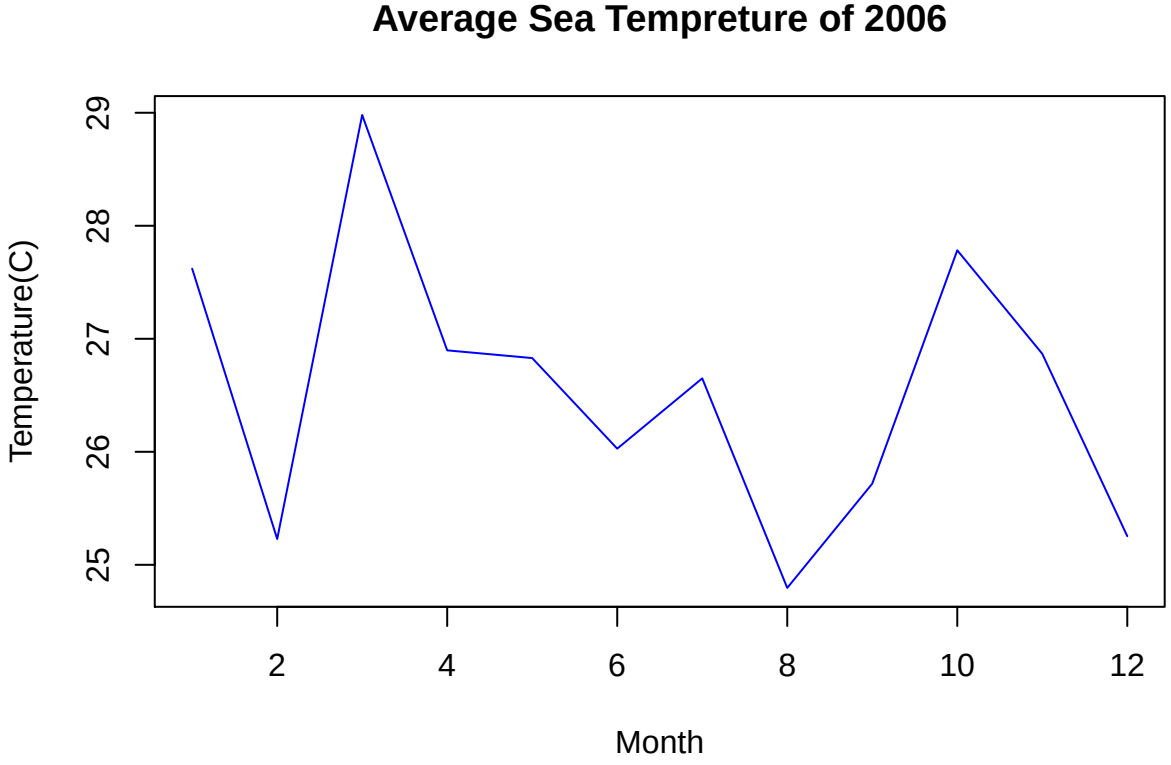

Average Air Tempreture of 2003
Temperature(C)
26.5
27.5
28.5
29.5
2
4
6
8
10
12
Month

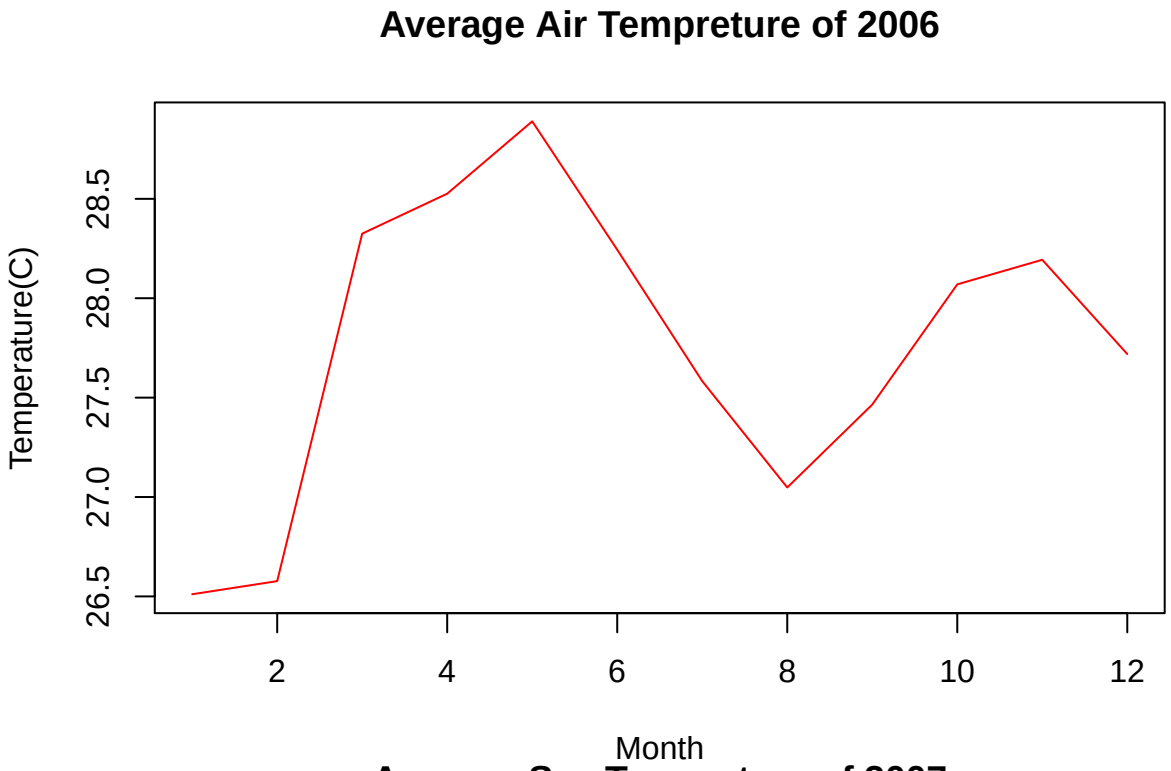

Average Sea Tempreture of 2004
Temperature(C)
21
22
23
24
25
26
27
28
2
4
6
8
10
12
Month

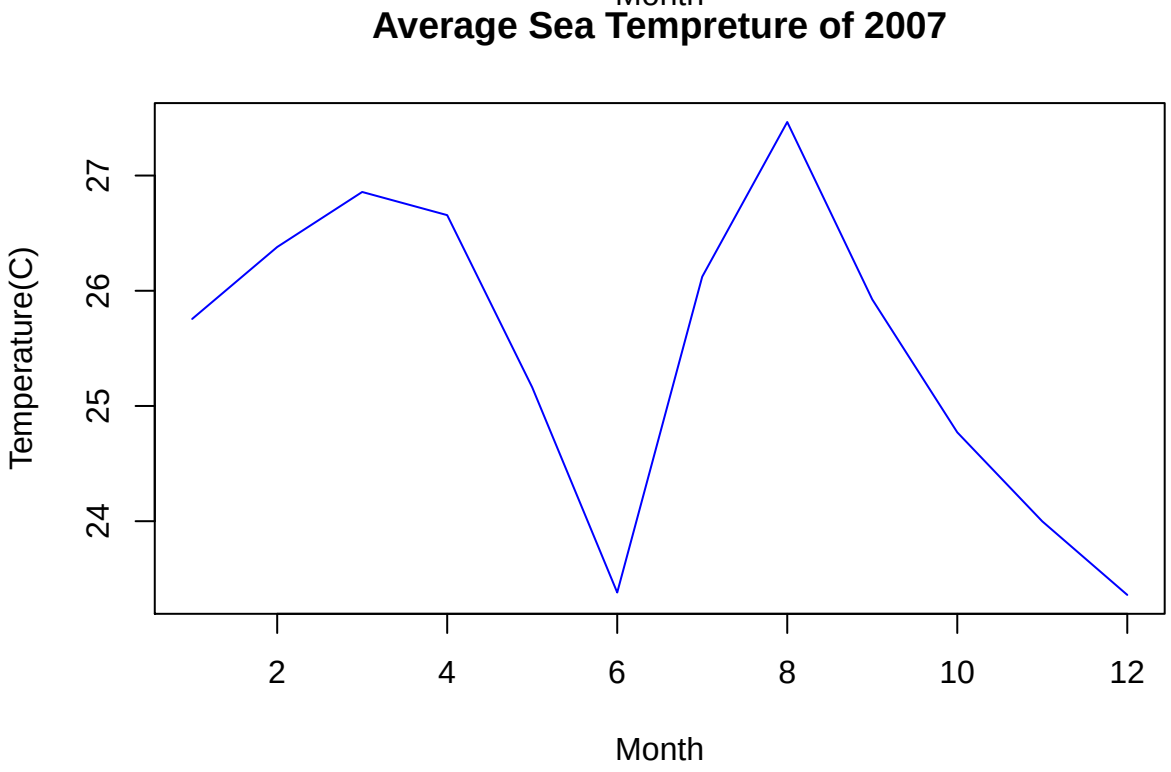

Average Air Tempreture of 2004
Temperature(C)
27.0
28.0
29.0
2
4
6
8
10
12
Month

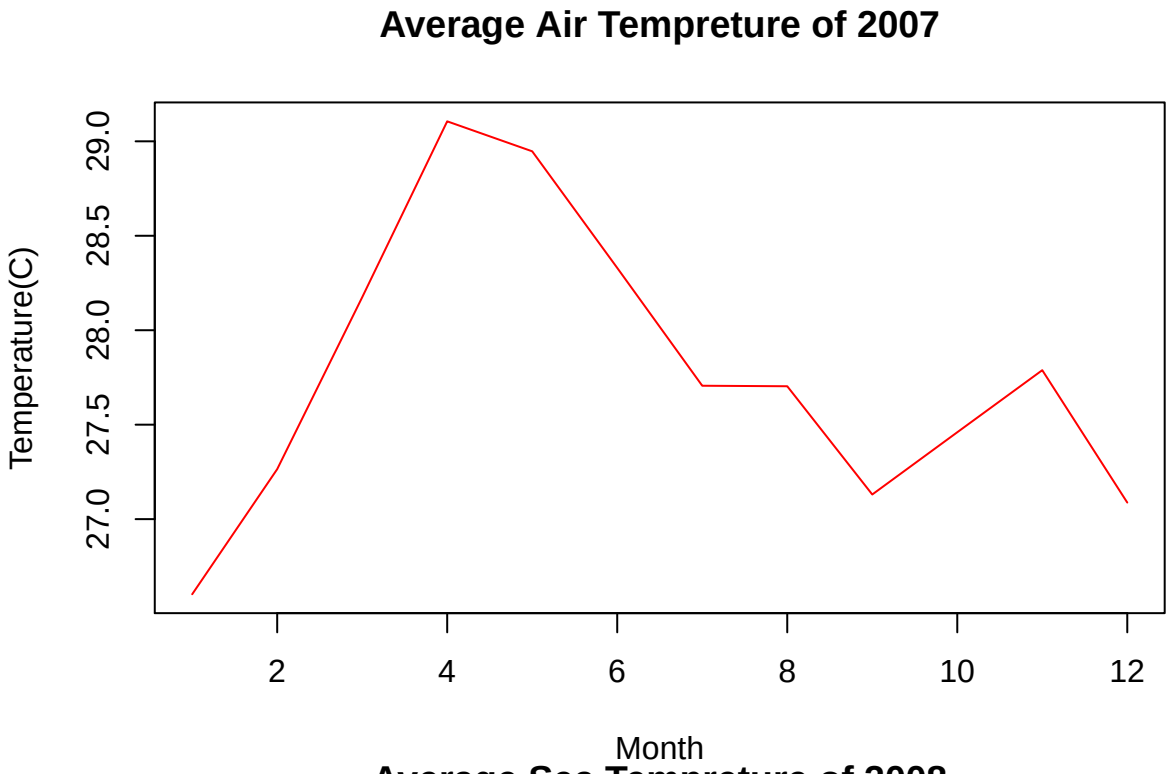

Average Sea Tempreture of 2005
Temperature(C)
22
24
26
28
30
2
4
6
8
10
12
Month

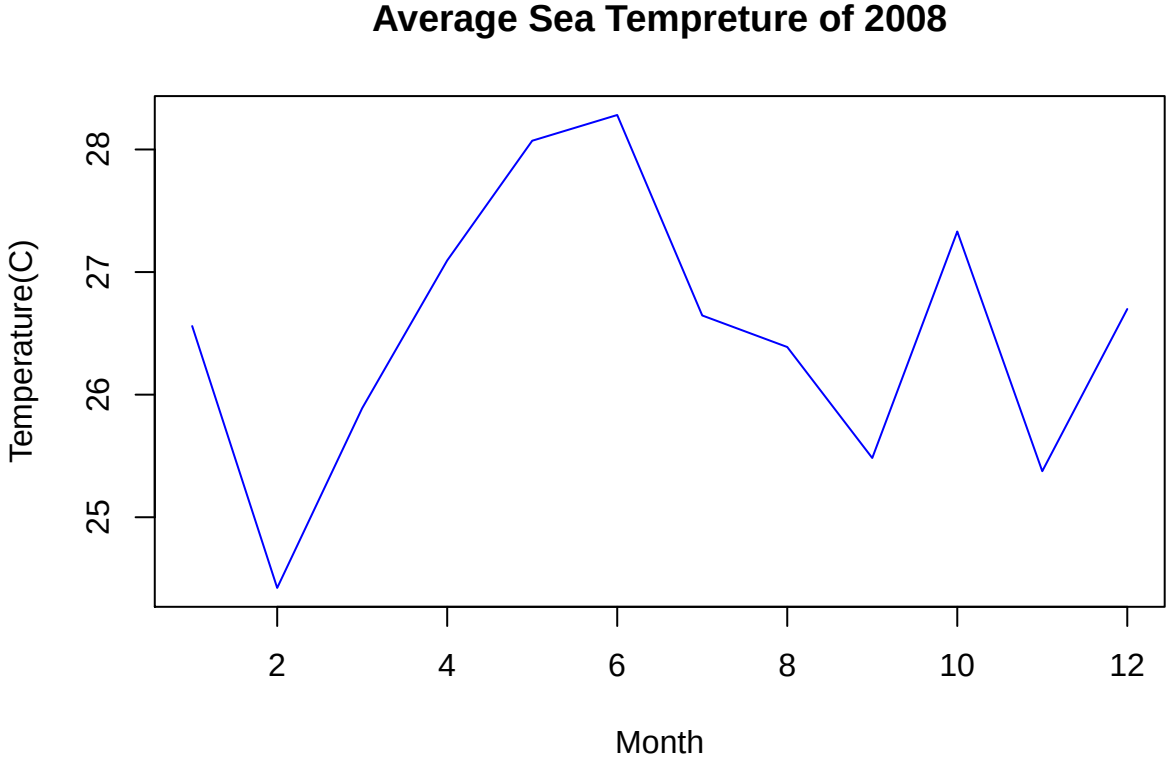

Average Air Tempreture of 2005
Temperature(C)
26.5
27.5
28.5
2
4
6
8
10
12
Month

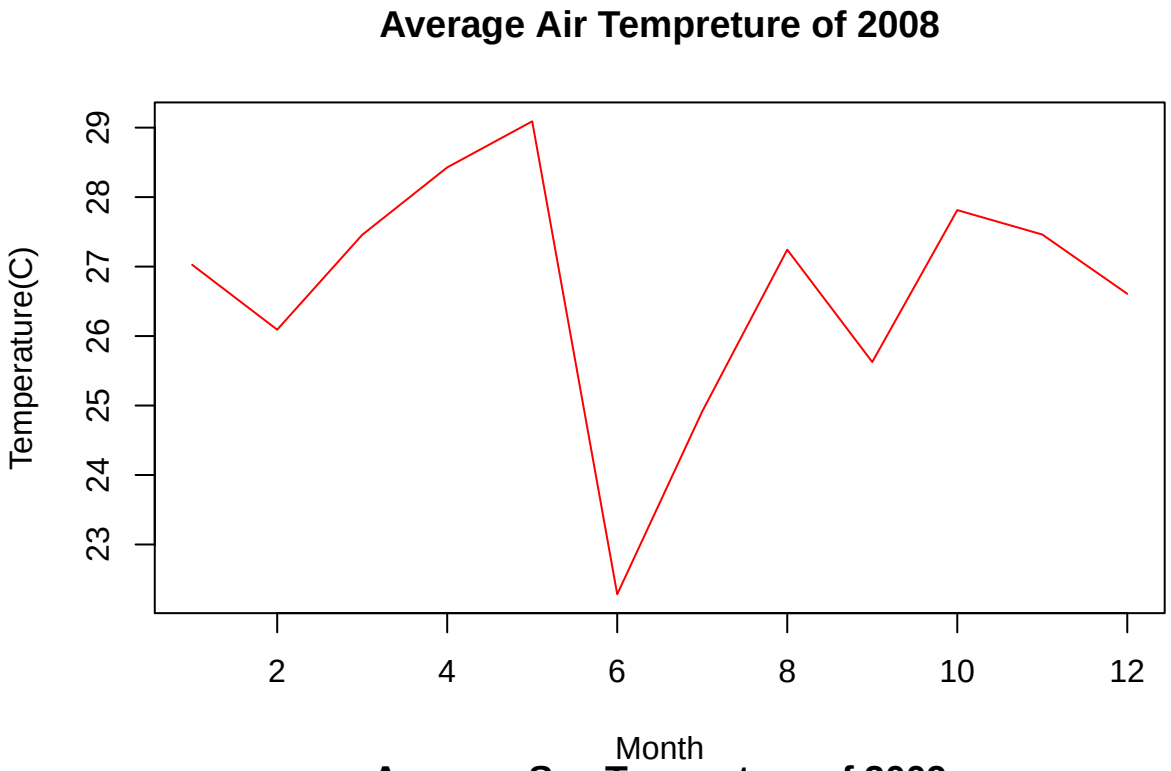

Average Sea Tempreture of 2006
Temperature(C)
25
26
27
28
29
2
4
6
8
10
12
Month

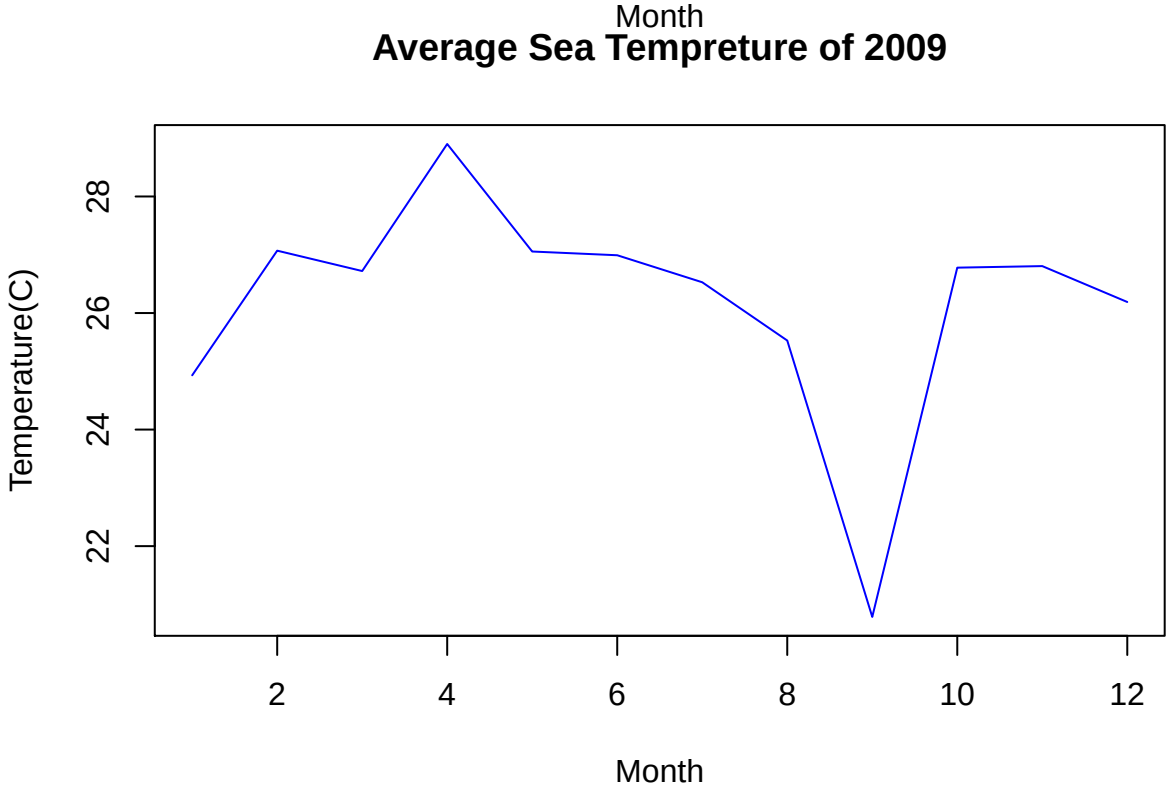

Average Air Tempreture of 2006
Temperature(C)
26.5
27.0
27.5
28.0
28.5
2
4
6
8
10
12
Month

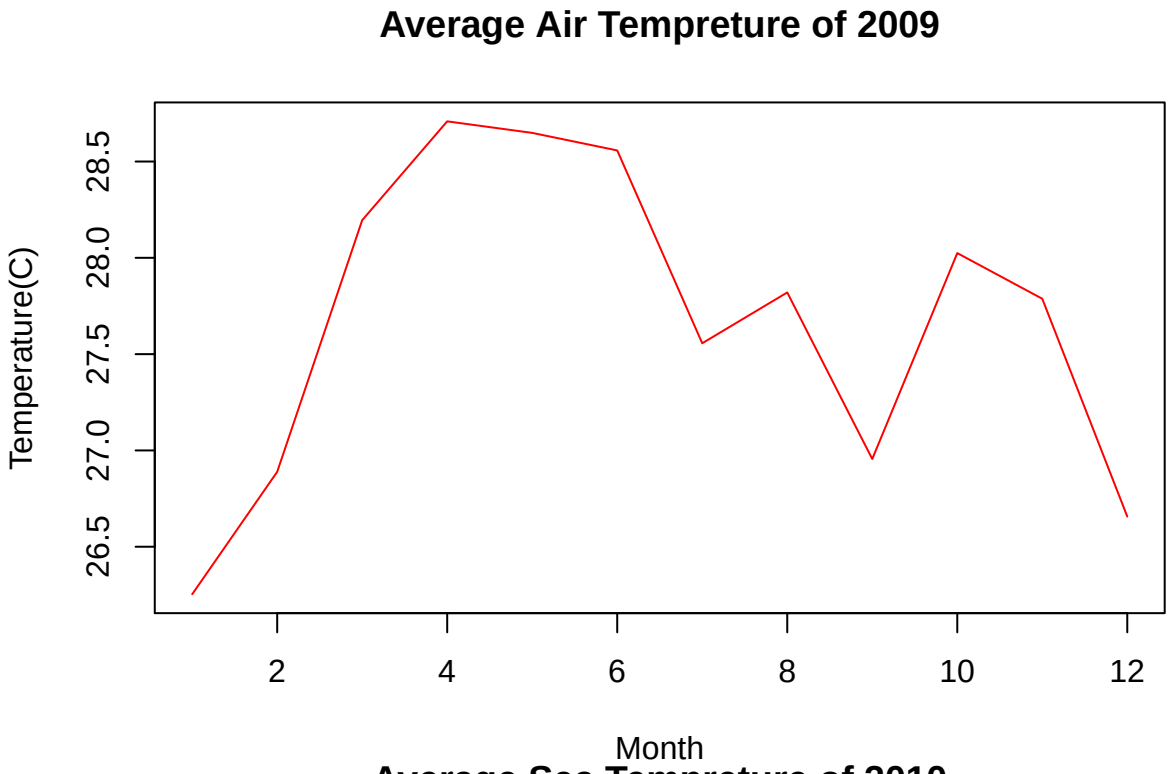

Average Sea Tempreture of 2007
Temperature(C)
24
25
26
27
2
4
6
8
10
12
Month

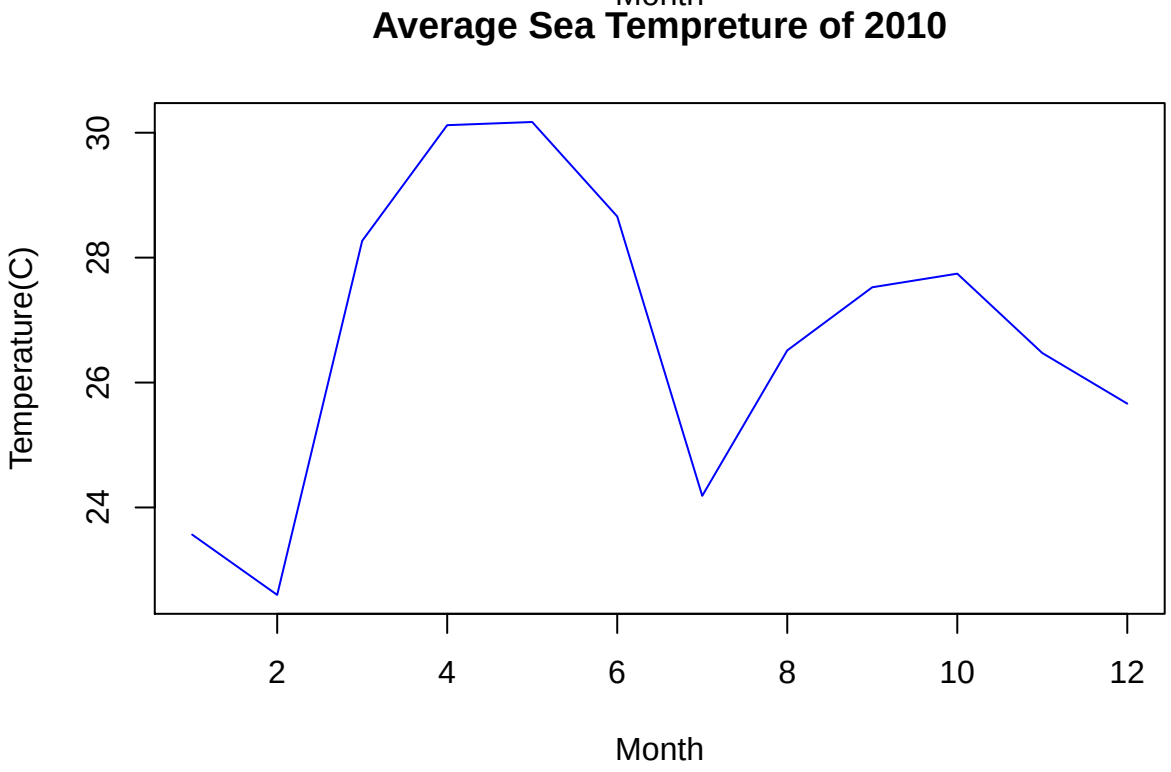

Average Air Tempreture of 2007
Temperature(C)
27.0
27.5
28.0
28.5
29.0
2
4
6
8
10
12
Month

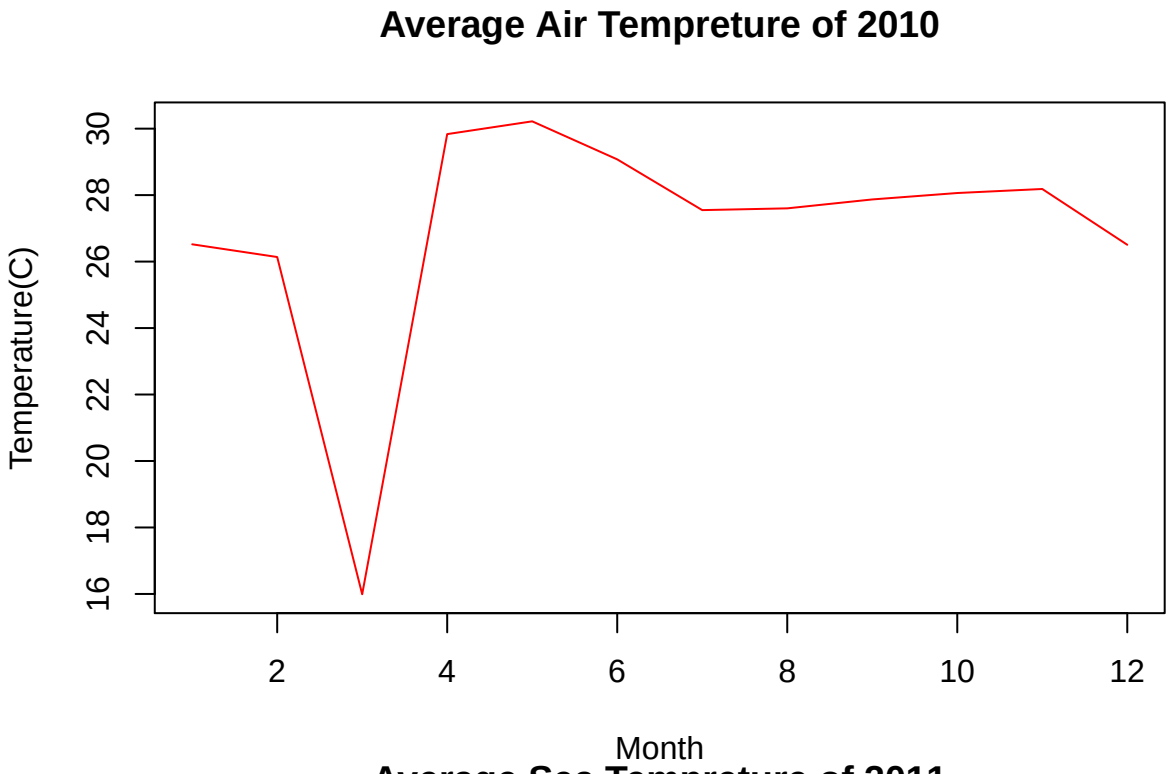

Average Sea Tempreture of 2008
Temperature(C)
25
26
27
28
2
4
6
8
10
12
Month

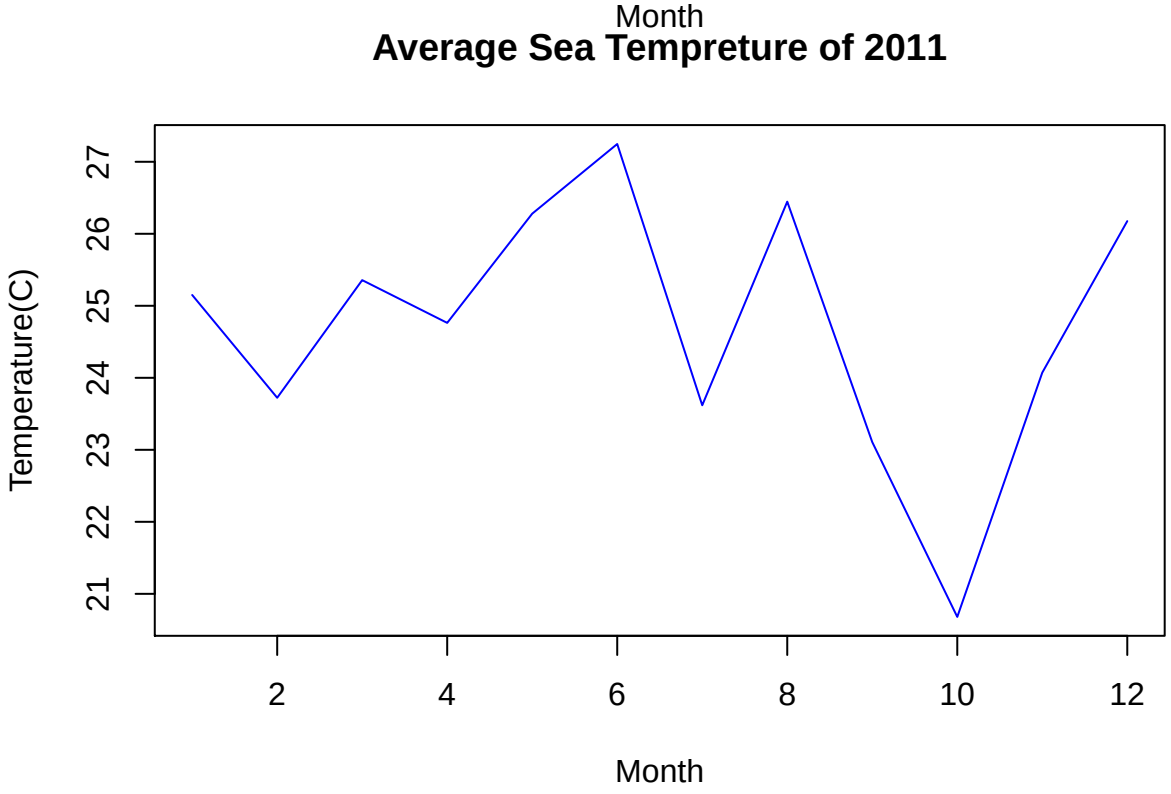

Average Air Tempreture of 2008
Temperature(C)
23
24
25
26
27
28
29
2
4
6
8
10
12
Month

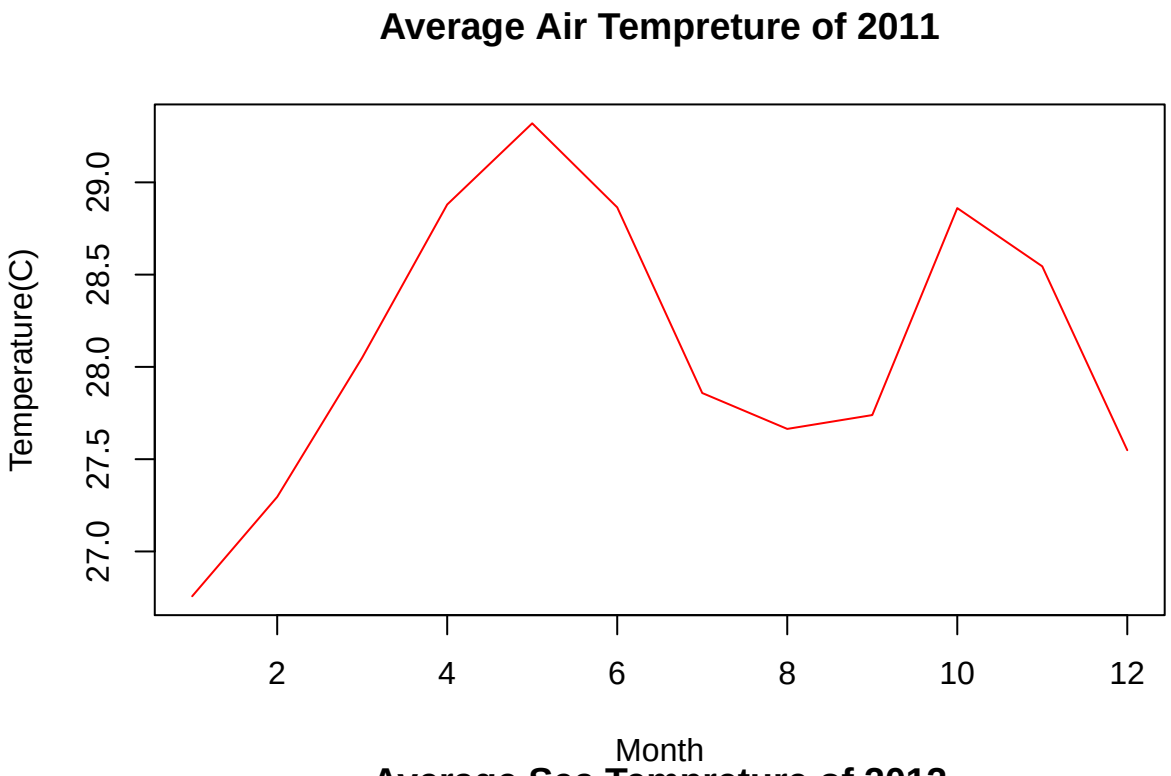

Average Sea Tempreture of 2009
Temperature(C)
22
24
26
28
2
4
6
8
10
12
Month

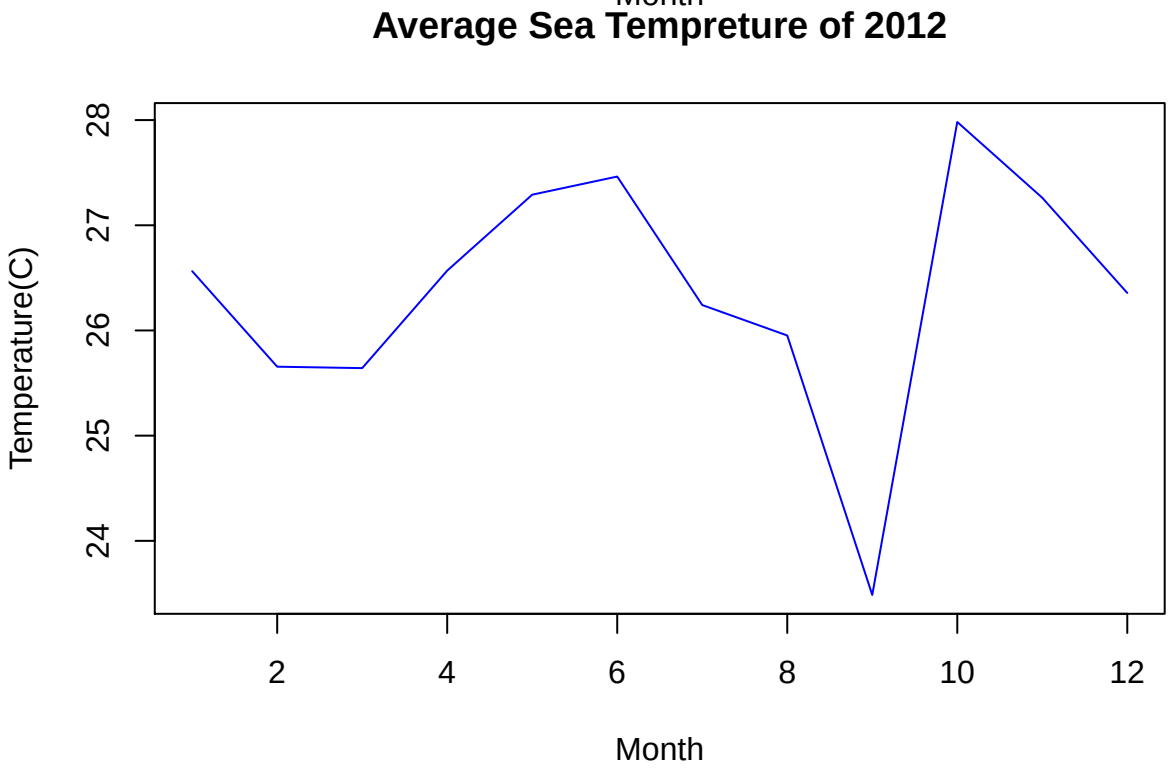

Average Air Tempreture of 2009
Temperature(C)
26.5
27.0
27.5
28.0
28.5
2
4
6
8
10
12
Month

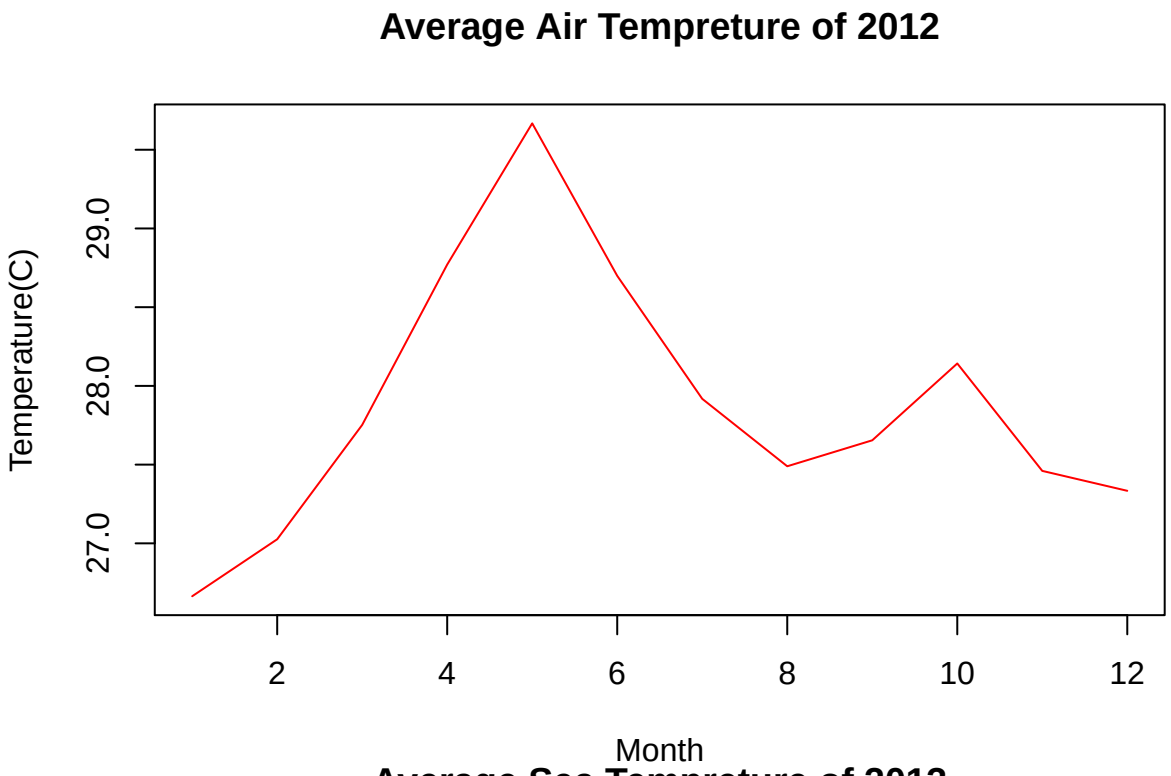

Average Sea Tempreture of 2010
Temperature(C)
24
26
28
30
2
4
6
8
10
12
Month

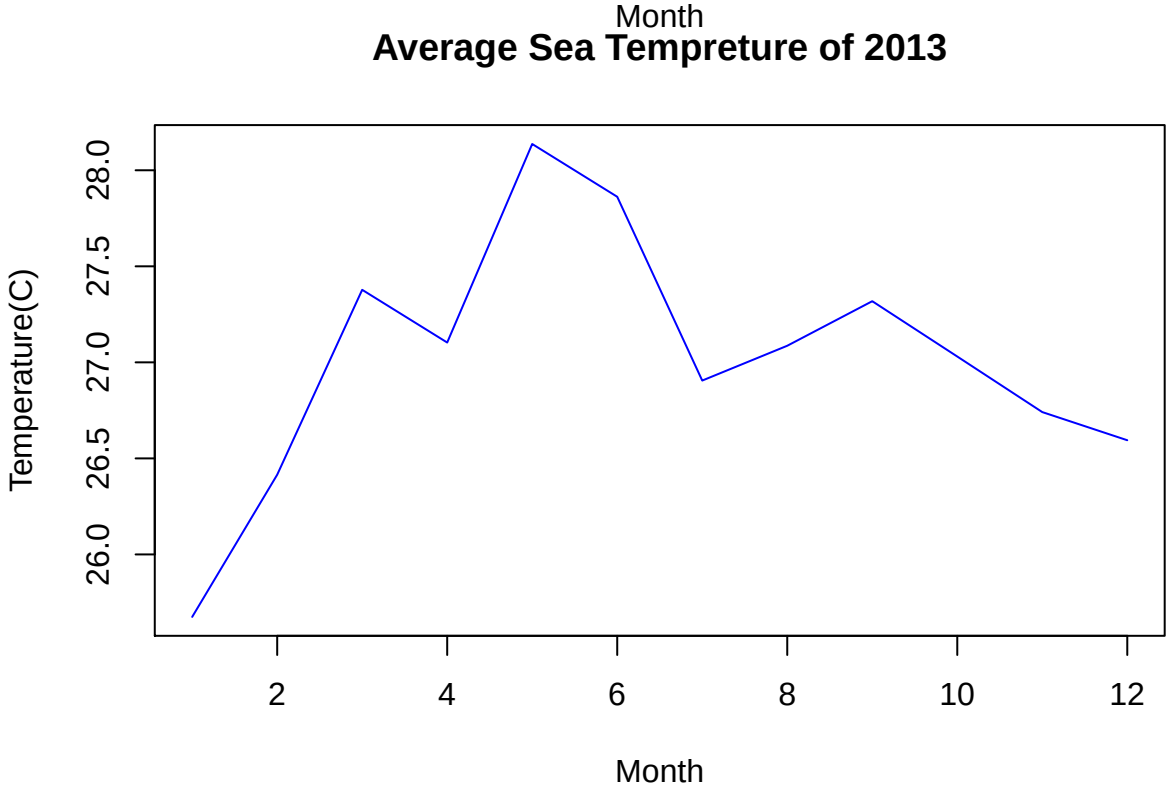

Average Air Tempreture of 2010
Temperature(C)
16
18
20
22
24
26
28
30
2
4
6
8
10
12
Month

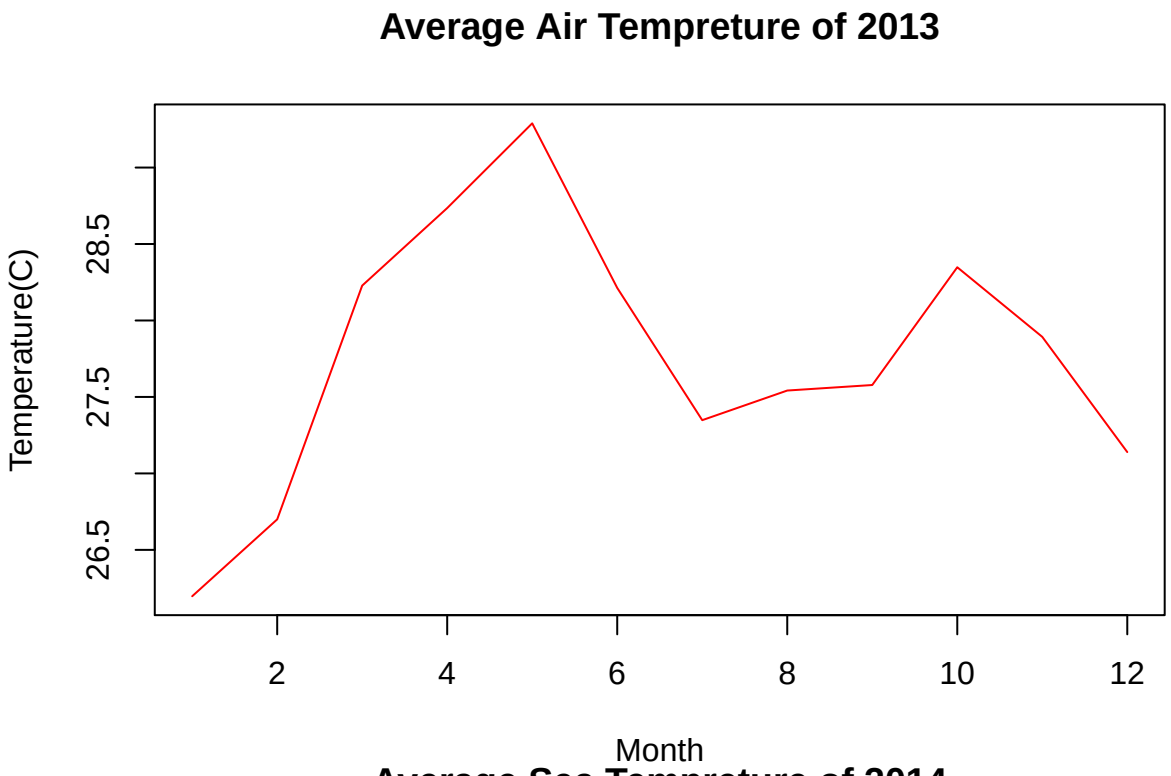

Average Sea Tempreture of 2011
Temperature(C)
21
22
23
24
25
26
27
2
4
6
8
10
12
Month

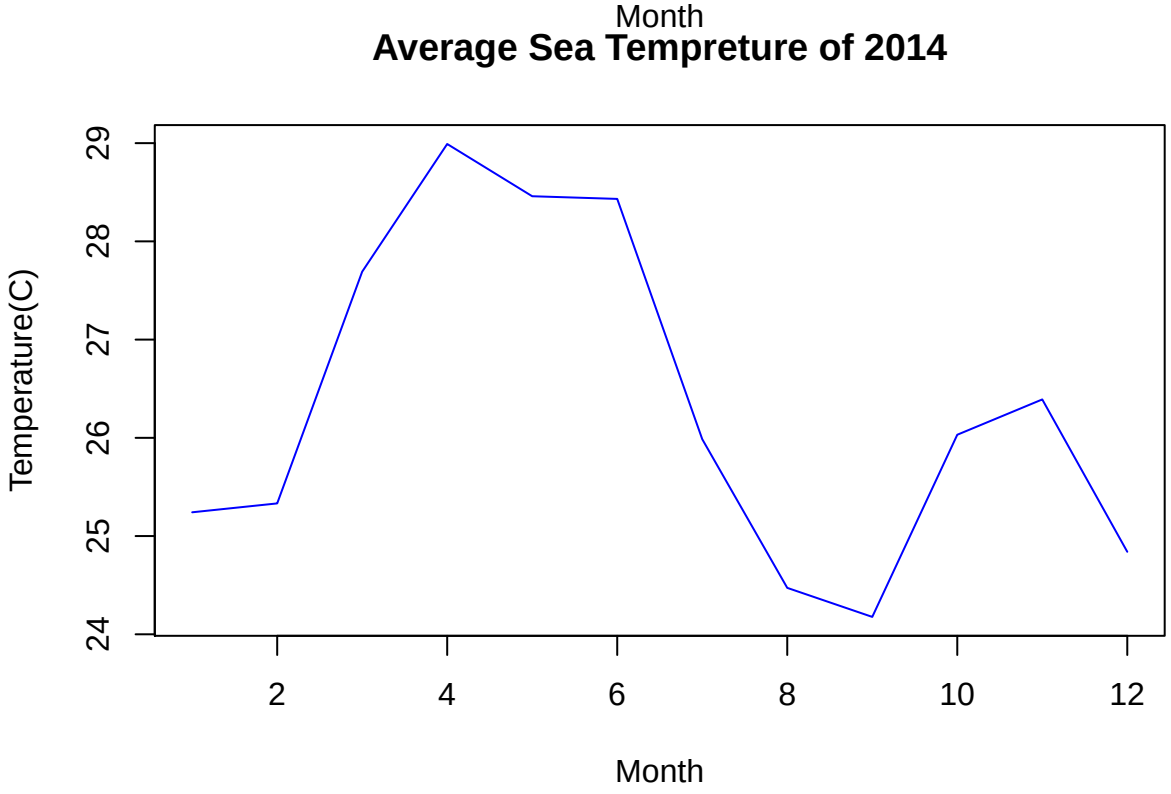

Average Air Tempreture of 2011
Temperature(C)
27.0
27.5
28.0
28.5
29.0
2
4
6
8
10
12
Month

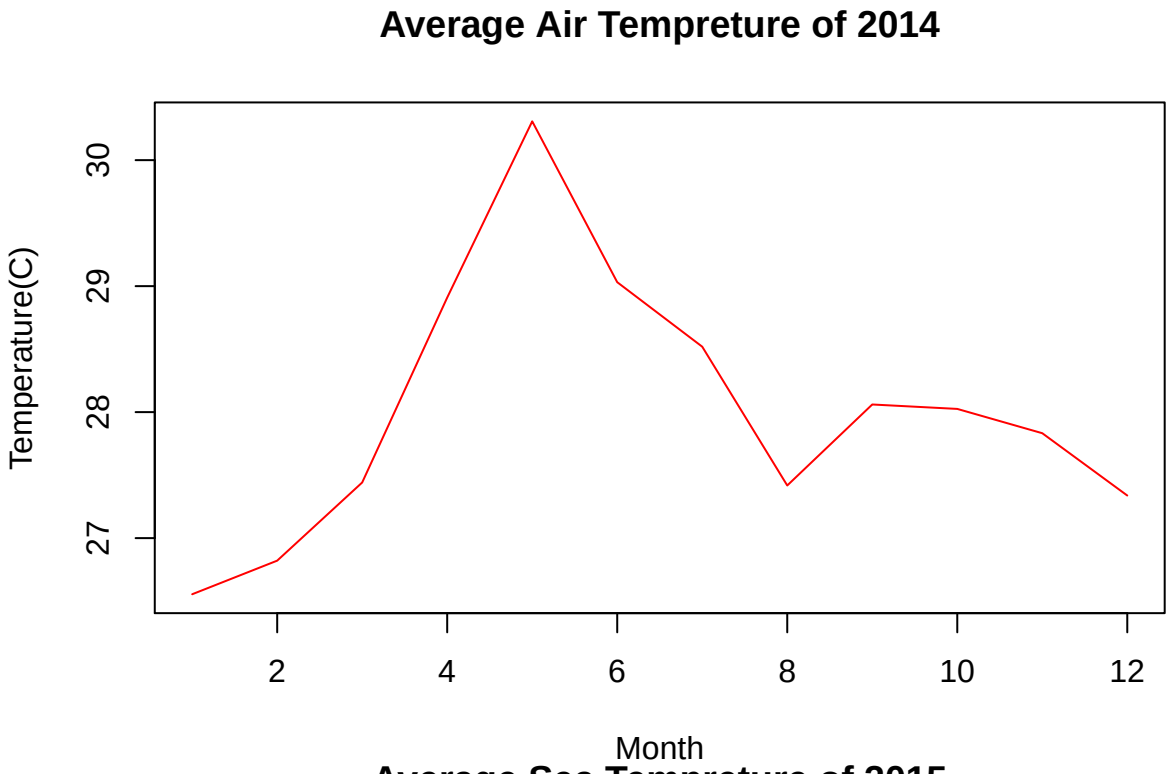

Average Sea Tempreture of 2012
Temperature(C)
24
25
26
27
28
2
4
6
8
10
12
Month

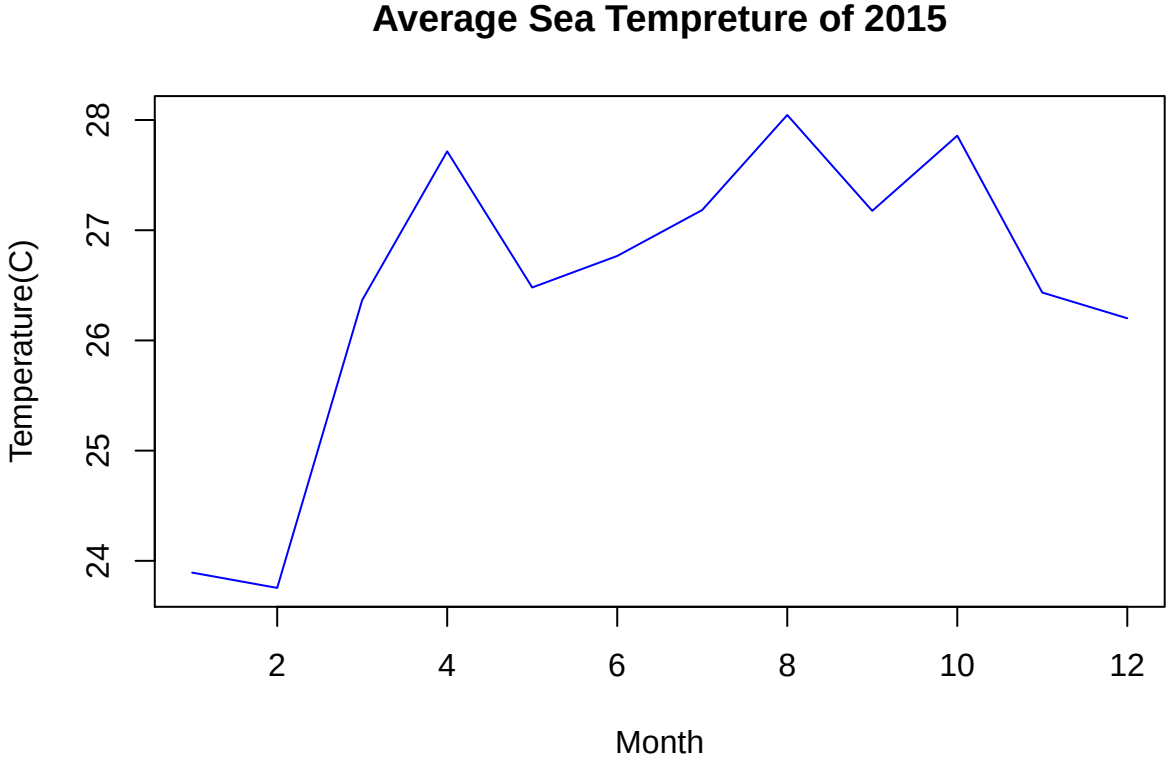

Average Air Tempreture of 2012
Temperature(C)
27.0
28.0
29.0
2
4
6
8
10
12
Month

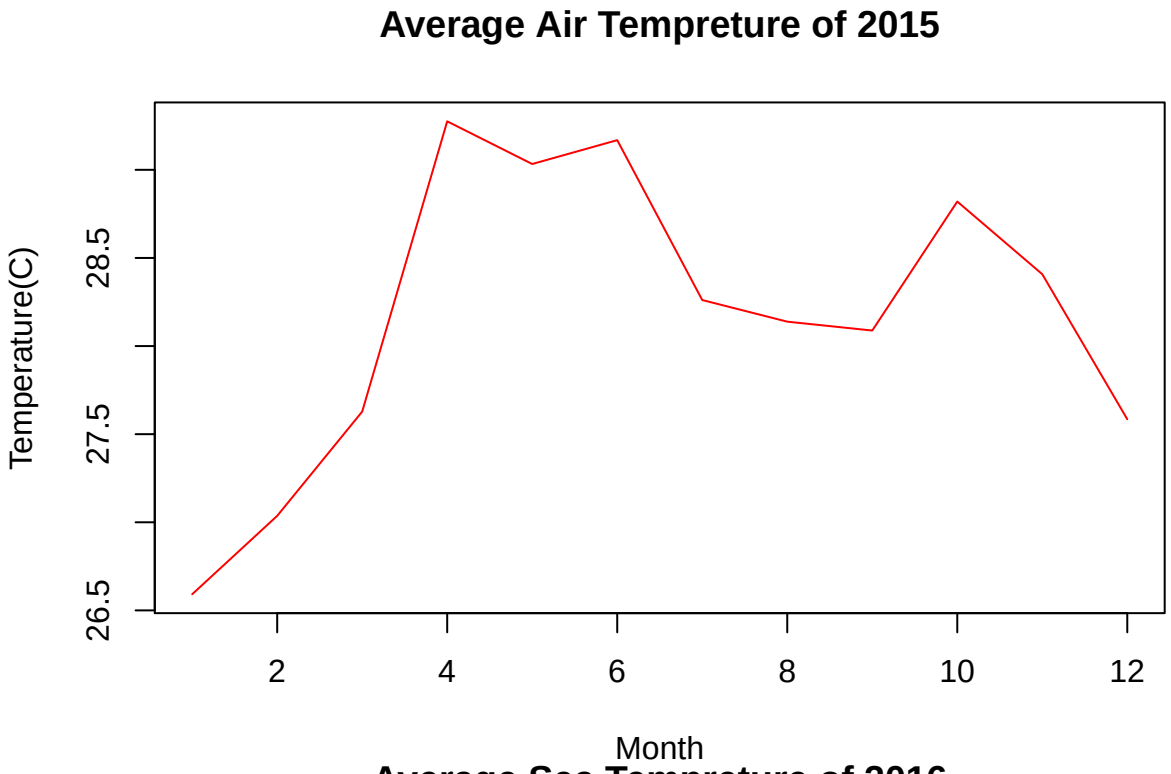

Average Sea Tempreture of 2013
Temperature(C)
26.0
26.5
27.0
27.5
28.0
2
4
6
8
10
12
Month

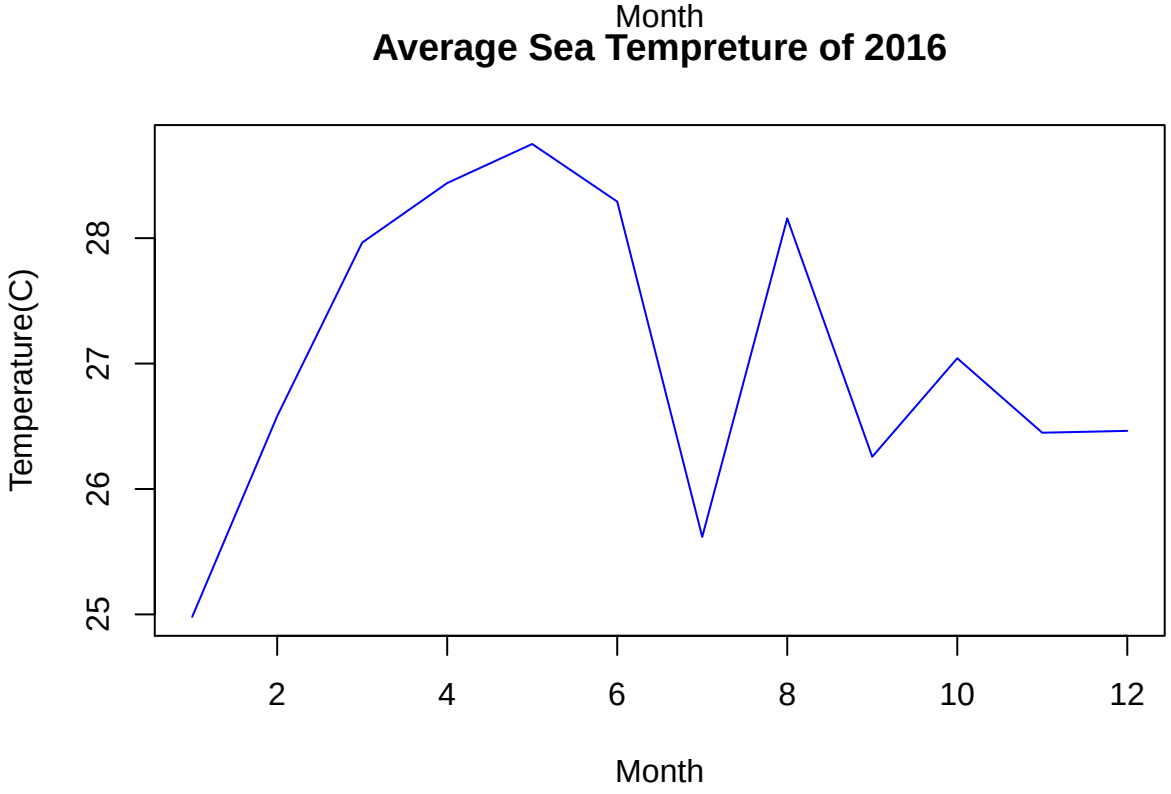

Average Air Tempreture of 2013
Temperature(C)
26.5
27.5
28.5
2
4
6
8
10
12
Month

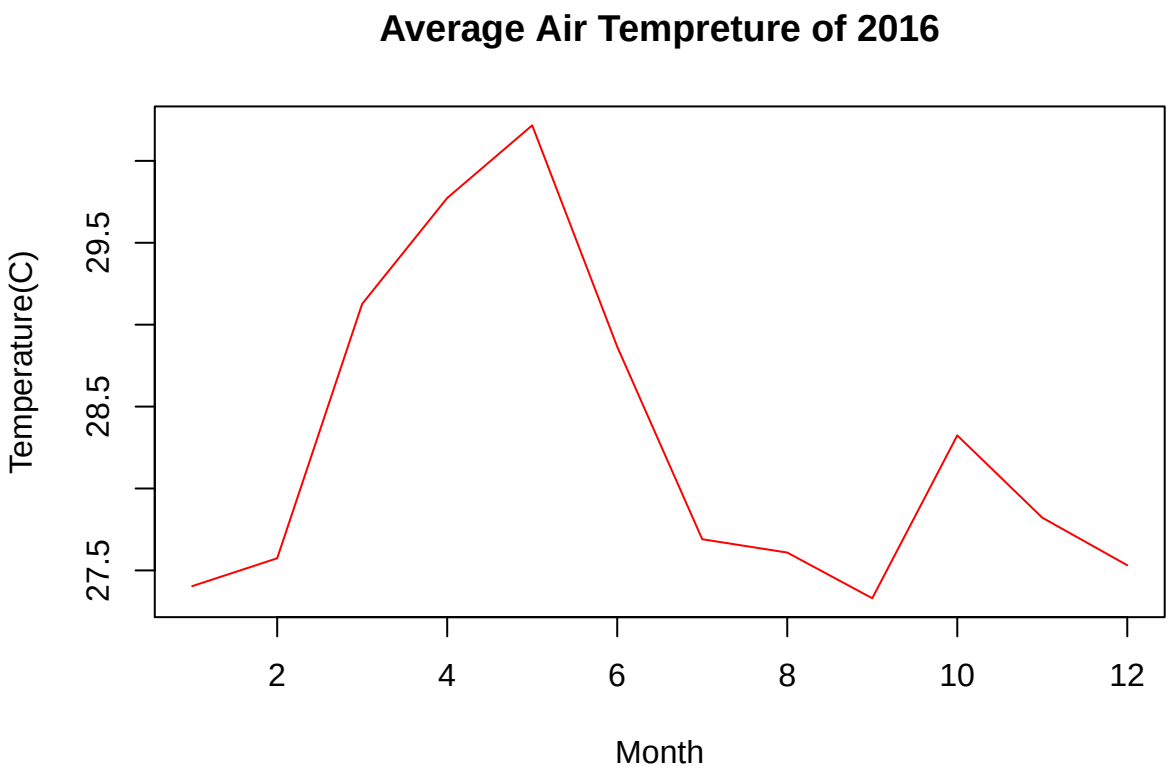

Average Sea Tempreture of 2014
Temperature(C)
24
25
26
27
28
29
2
4
6
8
10
12
Month


Average Air Tempreture of 2014
Temperature(C)
27
28
29
30
2
4
6
8
10
12
Month


Average Sea Tempreture of 2015
Temperature(C)
24
25
26
27
28
2
4
6
8
10
12
Month


Average Air Tempreture of 2015
Temperature(C)
26.5
27.5
28.5
2
4
6
8
10
12
Month

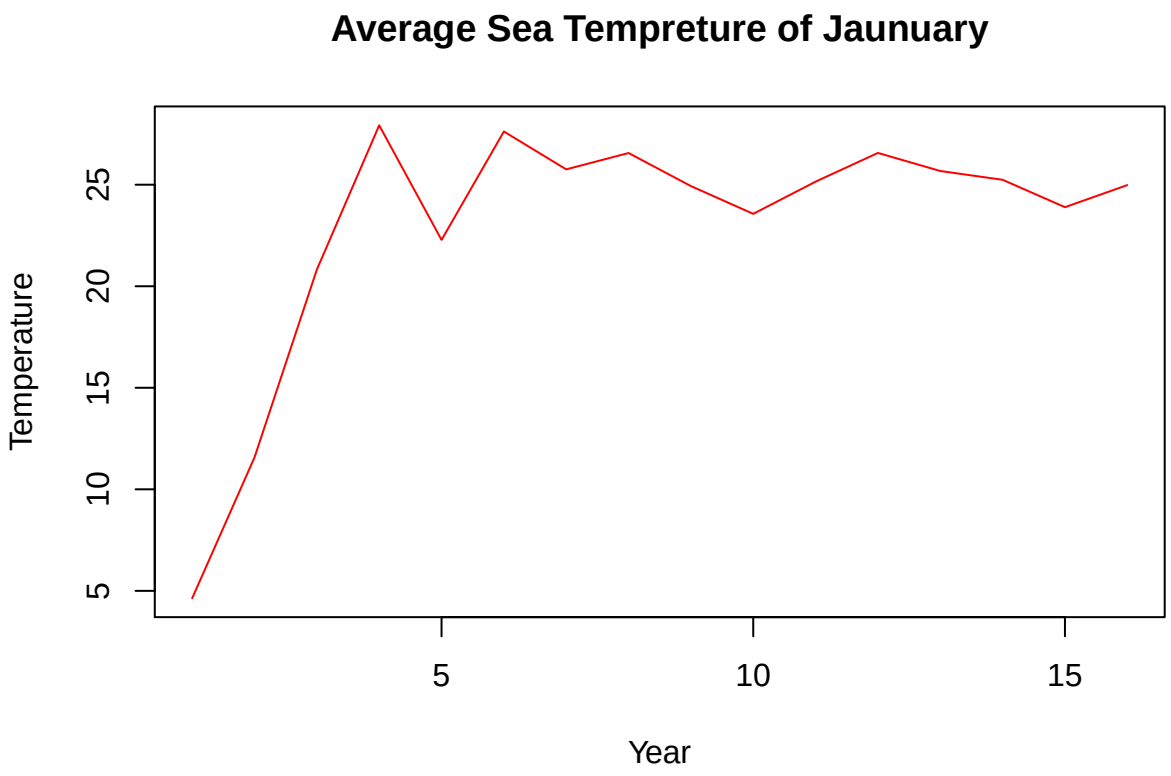

Average Sea Tempreture of 2016
Temperature(C)
25
26
27
28
2
4
6
8
10
12
Month



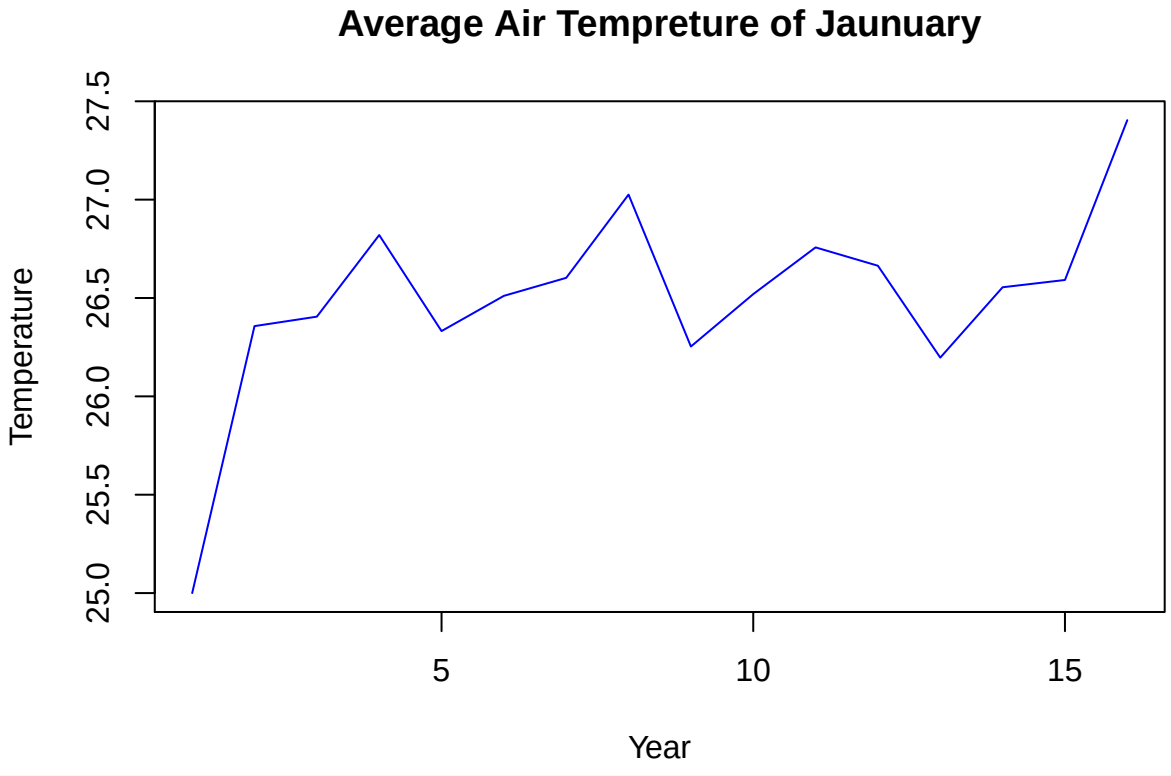

```
colnames(matrix.jan.temp) = c("Sea Temp" , "Air Temp")
rownames(matrix.jan.temp) = c("2001","2002","2003","2004","2005","2006","2007","2008","2009","2010","20

colnames(matrix.aug.temp) = c("Sea Temp" , "Air Temp")
rownames(matrix.aug.temp) = c("2001","2002","2003","2004","2005","2006","2007","2008","2009","2010","20
```

Summary and EDA of reported data. The Condition of the Data and Interesting Detail Without considering the location, lowest temperature is usually between December and January, while the highest temperatures around August. According to the geography, subcontinent west is close to equator so the temperature difference through the year should not be noticeable. Since water has bigger specific heat capacity, from the equation, we can predict that the sea temperature change has a smaller range than that of air temperature, which is consistence with our plots. Also, in our plots, there's no pattern showing increase or decrease of temperature from 2001 to 2016. The Data Acquisition and Density of Data. For our analysis purpose, ship data is used instead of buoy data, since buoy data only contains the measurement of water depth. Ship data is dependent on the fact that ships needed to be passing through our assigned area. Data from VOS website is divided per month from 2001 to 2016. we make sure the range is in sub-continent west by limit the range of latitude from 6 to 20 and longitude from 60 to 80. In order to make data fit into preferred region while remaining consistent through years, we measure our data within a 6-hour range of noon. We dropped all the data with "NA" value in order to keep our data logically and easy for analysis. By dropping extreme measurement that out of range between (0.01,0.99), we kept the consistency of our data.

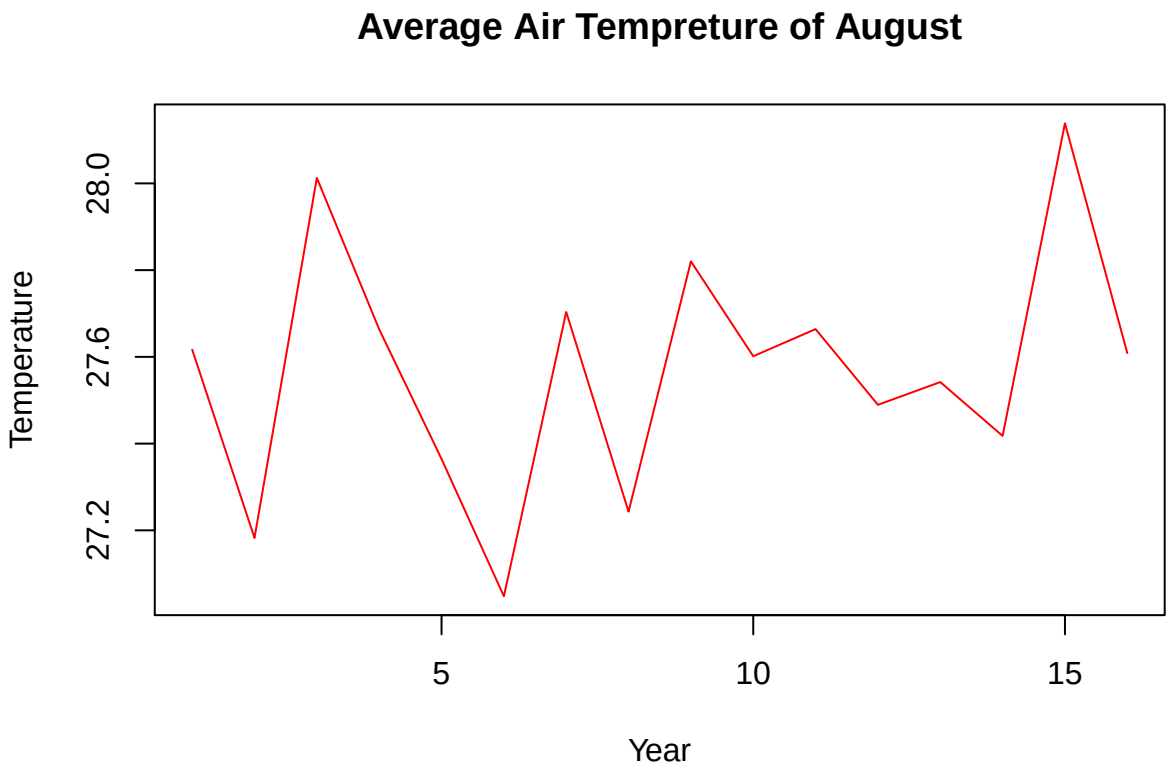
```
###### graphing the average tempruturs of JAN AND JUL across 16 years in a gragh.

#lines(matrix.jan.temp[,1])
plot(matrix.jan.temp[,1], type = "l",  main = "Average Sea Tempreture of Jaunuary" , xlab = "Year", ylab
```




```
plot(matrix.jan.temp[,2], type = "l",  main = "Average Air Tempreture of Jaunuary" , xlab = "Year", ylab
```




```
plot(matrix.aug.temp[,2], type = "l",  main = "Average Air Tempreture of August" , xlab = "Year", ylab =
```




```
plot(matrix.aug.temp[,1], type = "l",  main = "Average Sea Tempreture of August" , xlab = "Year", ylab =
```